EFFECT OF INTEGRATED THERAPEUTIC APPROACH (ITA) ON MATERNAL AND NEONATAL OUTCOME AMONG ANTENATAL MOTHERS WITH ANEMIA IN SELECTED RURAL AREAS OF PUDUCHERRY

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1. INTRODUCTION

Anemia is a serious public health issue that has a significant impact on both socioeconomic development and human health in both developed and developing nations. Although it can happen at any age, it is more common in small children and pregnant women.

It is estimated worldwide that 41.8% of pregnant and 30.2% of non-pregnant women are anemic.[1] The WHO has estimated that the prevalence of anemia in pregnant women is 14% in developed and 51% in developing countries. It is painful to mention that India contributes to about 80% of the maternal deaths due to anemia in South Asia.[2]

In underdeveloped nations, anemia is thought to be a substantial contributor to maternal and foetal morbidity and mortality.[3] Premature birth, low birth weight, foetal cognitive impairment, and foetal death could result from it.[4] Maternal complication includes preeclampsia, antepartum haemorrhage, puerperal sepsis and thromboembolic complications leading to subinvolution of the uterus, failure of lactation, and delayed wound healing. Despite anemia having been identified as a global public health problem for several years, no rapid progress has been observed, and the prevalence of the disease is still high globally.[5] Maternal knowledge on anemia is important because of its potential to encourage women to take iron supplements during pregnancy and after childbirth. It helps to improve the iron status of both the mother and the child.[6]

Anemia that occurs during pregnancy can be caused by the large number of women who start a pregnancy with insufficient food reserves or before becoming pregnant. More iron must be consumed during pregnancy than before. Insufficient food intake causes insufficient available iron for hemoglobin synthesis due to iron deficiency in food. Iron deficiency will result in the speed of formation of hemoglobin and its concentration in blood circulation decreases.[7]

During pregnancy, the mother experiences a number of physical and psychological changes. There is a demand to manage the results of the changes during all the stages of pregnancy and labour with physical, emotional, and mental.[8] Risk

factors, such as anxiety and stress related to maternal, are considered for potential negative consequences for foetus life.[9] The attention-deficit/hyperactivity disorder (ADHD) or decreased performance in executive function aspects.[10] Therefore, it is crucial to balance maternal stress and give expectant mothers enduring activities because the inevitable tensions help to improve the soul and to increase the wellbeing of the child.

Need for the study

Anemia is the most common nutritional disorder in the world affecting 2 billion people worldwide.[11] Total iron demand in pregnancy is about 900 mg (with a range of 700–1400 mg), of which about 500–600 mg is utilized for the growth of the uterus and fetal development. Around 150–200 mg of iron lost during delivery and a similar amount is expended in lactation. Due to the fact that the majority of pregnant women are involved in numerous activities that keep them busy all day, they do not prioritize their health. Therefore, it is essential to identify the risk factors for anemia in pregnant women in order to prevent and manage the condition.

In order to reduce anemia in pregnant women, India was the first developing nation to adopt the National Nutritional Anemia Control Programme. The Government of India recommends 100 mg of elemental iron+500 ug of folic acid for prophylactic supplementation for minimum of 100 days starting in the second trimester and doubles this dose for the treatment of anemia, that is, 200 mg of elemental iron+1000 ug of folic acid.[12] Despite these efforts, the prevalence of anemia is 52.2% in India & 42.5% in Puducherry during 2019-2020. (https://www.indiastathealth.com/puducherry-state/data/health/anaemia).

Wrong eating pattern results in reduced intake of nutrients which was the biggest cause of nutritional anemia. In addition to give blood supplement tablets pregnant women must also be able to maintain their body condition, especially the stability of the hemoglobin content in the body. For example, by maintaining a diet and eating foods and fruits that contain lots of iron and vitamins and other substances that are good for people with anemia.[13] One of them is by consuming rice flakes laddu. Because rice flakes contain lots of iron and other compounds that are good for health. Folic acid is needed by pregnant women, because the need for folic acid will increase during pregnancy. The provision of rice flakes laddu is very influential on

increasing levels of hemoglobin pregnant women who have anemia. So, it can be stated if rice flakes laddu is one of the factors that can increase the Hb levels of anemic pregnant women.

Thus, this study is taken to establish Integrated Therapeutic Approach can treat mothers with anemia in all situations rather each mother needs to be considered as a whole and counselling method must be customized to each person's demands and circumstances.

2. AIM AND OBJECTIVES

2.1 Aim:

To evaluate the Effectiveness of Integrated Therapeutic Approach (ITA) on Maternal and Neonatal outcome among Antenatal Mothers with Anemia.

2.2 Objectives of the study

- To identify the level of anemia among antenatal mothers through haemoglobin assessment.
- To assess the level of knowledge on anemia among antenatal mothers.
- To assess the level of stress and anxiety among antenatal mothers with anemia.
- To evaluate the effect of integrated therapeutic c approach (ITP) on level of anemia, knowledge, stress and anxiety among Antenatal mothers with Anemia.
- To evaluate the effect of integrated therapeutic approach (ITP) on maternal and neonatal outcome between experimental and control group in post-test among Antenatal mothers with anemia.
- To find out correlation between level of anemia, level of knowledge, stress, anxiety, maternal and neonatal outcome.
- To find out the association between the level of anemia, knowledge, stress and anxiety with selected demographic, obstetrical and dietary variables.

3. HYPOTHESES

H1: Level of anemia**,** knowledge, stress and anxiety among antenatal mothers with anemia differs between before and after administration of Integrated Therapeutic Approach.

H2: Maternal and neonatal outcome among antenatal mothers with anemia differs between experimental and control group after administration of Integrated Therapeutic Approach.

H3: Correlation exists between level of anemia, knowledge, stress, anxiety, maternal and neonatal outcome among antenatal mothers with anemia.

H4: Association exists between the level of anemia, knowledge, stress and anxiety with selected demographic, obstetrical and dietary variables.

4. REVIEW OF LITERATURE

A review of literature is an essential aspect of scientific research as it helps the investigator to establish support for the need of the study, select research design, developing the tool and data collection technique.

4.1 Review related to level of anemia among antenatal mothers.

4.2 Review related to level of knowledge on anemia among antenatal mothers.

4.3 Review related to level of stress and anxiety among antenatal mothers with anemia.

4.4 Review related to effect of integrated therapeutic approach (structured counseling, dietary supplement and yoga therapy) on level of anemia, knowledge, stress, anxiety, maternal and neonatal outcome among antenatal mothers with anemia.

4.1 Review related to level of anemia among antenatal mothers.

A Hospital-based cross-sectional descriptive study on anemia and its risk factors among 200 pregnant women attending antenatal clinic of a rural medical college of West Bengal The result found that overall prevalence of anemia to be 90% among pregnant women. Most of the anemic patients (60.5%) belong to moderate severity according to the World Health Organization classification. Three factors namely socioeconomic status, gravida and time of 1st antenatal visit were significantly associated with prevalence of anemia in pregnancy ($P < 0.05$).[14]

A field study on Prevalence of nutritional anemia in pregnant women in selected slum areas under the Cuttack municipal corporation, Odisha state (India). The result showed that nearly 41% and 30% respondents were suffering from mild and moderate anaemia respectively with other infections and deficiencies. 72% had several numbers of pregnancies and among them 40% have number of abortions; 67% women were affected by different food taboos; 90% had zero knowledge about different food groups.[15]

4.2 Reviews related to level of knowledge on anemia among antenatal mothers.

A quasi-experimental study was conducted to assess the effectiveness of structured teaching programme on knowledge regarding Antenatal care among primigravida mothers Primary Health Center in Alamarathupatty at Dindigul. They used convenient sampling technique. The tools used for data collection were Demographic Data was collected through self-report and interview method. The results showed that there was significant increase in mean post test score after the structured teaching program among primi mothers t=41.132(P=0.05). The obtained t=0.361 regarding post test score and age of primigravida mothers was significant age made significant difference in mean difference knowledge among primigravida mothers.[16]

4.3 Reviews related to level of stress and anxiety among antenatal mothers with anemia.

A systematic review was conducted to update and provide a comprehensive overview on the psychological effects of antenatal yoga on pregnancy compared to standard prenatal care. Four databases were searched. The results showed that antenatal yoga may be safe and may effectively decrease stress levels, anxiety scores, depression scores, and pain response as well as increasing maternal immunity and emotional-wellbeing.[17]

4.4 Reviews Studies related to effect of integrated therapeutic approach (structured counseling, dietary supplement and yoga therapy) on level of anemia, knowledge, stress, anxiety, maternal and neonatal outcome among antenatal mothers with anemia.

A meta-analysis for the effect of Nutrition education and counselling (NEC) on maternal, neonatal and infant health outcomes including gestational weight gain, maternal anaemia, birthweight, low birthweight and preterm delivery. They used a modified Child Health Epidemiology Reference Group method by systematically reviewed the literature and identified and abstracted 37 articles. The results showed that NEC had significantly improved gestational weight gain by 0.45 kg, reduced the risk of anaemia in late pregnancy by 30%, increased birthweight by 105 g and lowered the risk of preterm delivery by 19%. They concluded that the effect of NEC

was greater when provided with nutrition support, for example, food or micronutrient supplements or nutrition safety nets.[18]

The systematic review to assess the effectiveness of dietary interventions in the prevention and treatment of iron-deficiency anemia in pregnant women based on randomized controlled trials from the 7825 screened records. The procedure of screening, inclusion, reporting, and assessment of the risk of bias while using the revised Cochrane risk tool. The results showed that all applied dietary interventions, based on providing increased amount of iron, providing increased amount of multiple nutrients, or general counselling only, were effective.[19]

A retrospective study to evaluate the effect of antenatal exercises, including yoga, on the course of labor, delivery, and pregnancy outcomes among 200 primiparous subjects (aged 20–40). A semi-structured questionnaire was provided to obtain their demographic and obstetrical information 6 weeks after delivery, and their hospital records were also assessed for further details. Based on the nature and details obtained for the antenatal exercises, subjects were divided into two groups: control and exercise. The results showed that the subjects who followed regular antenatal exercises, including yoga, had significantly lower rates of cesarean section, lower weight gain, higher newborn infant weight, lower pain and overall discomfort during labor, lower back pain throughout pregnancy, and earlier post-partum recovery compared to those who did no specific exercises or only walked during pregnancy.[20]

5. METHODOLOGY

5.1 Research Approach

Quantitative research approach was adopted in this study.

5.2 Research Design

The research design used in the study was Experimental design- Pre-test Post-test control group design.

- O1 – Pre assessment of the level of anemia, knowledge, stress, and anxiety in Experimental Group and Control Group.
- X – Implementation of Integrated Therapeutic Approach (structured counseling, rice flake laddu and yoga therapy) in Experimental Group.
- Y – Routine management protocol in Control Group.
- O2- Post assessment of the level of knowledge (after 7 days) in Experimental Group and Control Group.
- O3- Post assessment of the level of anemia (3 repeated measures of hemoglobin taken within 100^{th} day of intervention (33^{rd}, 64^{th} & 100^{th}) and after delivery a week of washout period again hemoglobin was taken.) in Experimental Group and Control Group.
- O4- Post assessment of the level of stress and anxiety (after 10 sessions) in Experimental Group and Control Group.
- O5- Post assessment of maternal and neonatal outcome in Experimental Group and Control Group.

5.3 Study variables

Independent Variables

Integrated Therapeutic Approach (ITA) consists of

- Structured counseling
- Dietary supplements
- Therapeutic yoga

Dependent Variables

- Haemoglobin.
- Level of knowledge on anemia.
- Stress.
- Anxiety.

Maternal and Neonatal outcome.

5.4 Research Setting

The study was conducted in the rural areas of Puducherry. The rural areas under experimental group were Krishnavaram, Pudukuppam, Koravallimedu, Moorthikuppam and in control group were Bahour (East), Manapet, Parikkalpattu, Kuruvinatham.

5.5 Population

The target population of the study was all the antenatal mothers with anemia.

5.6 Sample, Sample size and Sampling Technique

Sample

Antenatal mothers with anemia who satisfied the inclusion criteria during the data collection period and who were in rural areas of Puducherry.

Sample Size

$$n_{1=} \frac{2[Z_1\text{-}\ \alpha/2 + Z_1\text{-}\ \beta]^2 * P\ [1\text{-}P]}{[p_1 - p_2]^2}$$

$Z_1\text{-}\ \alpha/2 = 1.96$ @ 95% of confidence with $\alpha = 0.05$

$Z_1\text{-}\ \beta = 0.84$ @ 80% of power with $\beta = 0.20$

$p_1 = 0.877 = 87.7\%$ from pervious study [**citation:** Bansal R, Bedi M, Kaur J, Kaur K, Shergill HK, Khaira HK, et al. Prevalence and factors associated with anemia among pregnant women attending antenatal clinic. Adesh Univ J Med Sci Res 2020;2(1):42-8.]

$p_2 = 0.627 = 62.7\%$ assumed to reduce the 25% of burden

$$p = \frac{p_1 + p_2}{2} = \frac{0.877 + 0.627}{2} = \frac{1.504}{2} = 0.752$$

$$n_1 = \frac{2[1.96 + 0.84] * 0.752\ [1-0.752]}{[0.877 - 0.627]^2} = 46.72$$

$n_1 = 47$

Since the sampling procedure is cluster random sampling,

We consider d.e is 2

$n = n_1 * d.e$

$n = 47 * 2$

$n = 94$ in each group

Considering 10% of attrition

$n = n_1 + n_1 * 10\%$

$= 94 + 94 * 10\%$

$= 94 + 9.4$

$= 103.4$

$= 104$ in each group

- Therefore**,** the total sample size is 208 (Experimental - 104 & Control -104)

Sampling technique

Cluster Random Sampling was used to select the rural areas and simple random Sampling Technique by random number generation method was used to select the samples for the study.

Four clusters (areas) randomly allocated for each group. In each cluster 26 samples were selected randomly in view of inclusion and exclusion criteria. Totally 26 x 4 = 104 sample were selected for each experimental and control group. Finally 208 sample were collected for the study.

5.7 Inclusion criteria:

Antenatal mothers who

- were in the age group between 21 to 35 years with 22-24 weeks of gestation till delivery.
- were diagnosed with anemia
- were primigravida & multigravida
- had the hemoglobin level above 7g/dl to below 11g/dl (ICMR)
- were available during the study period

5.8 Exclusion Criteria:

Antenatal mothers who

- had high risk pregnancy including gestation diabetic mellitus & hypertension
- were experienced with co-morbid illness.
- were not willing to participate in the study.
- had been received any other alternative therapy

5.9 Description of tool:

The tool consists of two sections, i.e **Section I:** Identifies the Socio Demographic, Obstetrical and dietary variables of antenatal mothers with anemia. Section II: Identifies Hemoglobin Level by Mission Plus Hemoglobin Strips, Level of knowledge using Structured Questionnaire, stress level by Perceived Stress Scale (PSS), Anxiety assessment using Generalized Anxiety Disorder scale, observational checklist for maternal and neonatal outcome

5.10 Methods of Data Collection

After obtaining the Institutional Human Ethics Committee (***IHEC***) and registered in Clinical Trial Registers of India **(CTRI).** The study was conducted in selected areas of Puducherry. The purposes of the study will be well explained and informed consent will be obtained from the participants. Data collection was carried out for a period of 1 year. Cluster Random Sampling was used to select the rural areas and simple random Sampling Technique by random number generation method was used to select the samples for the study.

Four clusters (areas) randomly allocated for each group. In each cluster 26 samples were selected randomly in view of inclusion and exclusion criteria. Totally 26 x 4 = 104 sample were selected for each experimental and control group. Finally, 208 sample were collected for the study. Antenatal anemic mothers were traced out and classified in to mild & moderate anemia.

Pretest data was collected from both experimental and control group by using demographic variables, obstetrical and dietary variables, Level of anemia using mission plus hemoglobin strips, assessment of level of knowledge on anemia, stress & anxiety.

For experimental group, Interventions includes

- **Structured counseling**: In Pretest knowledge was assessed with structured questionnaire and continued with counseling sessions for duration of 20 minutes and Post test was carried out after 7 days.

- **Dietary supplements (Rice flakes laddu):** In Pre-test, hemoglobin was measured with mission plus hemoglobin strips, a 150 g of rice flakes laddu was administered daily for 100 days for experimental group, 3 repeated measures of hemoglobin taken within 100^{th} day of intervention (33^{rd} day, 64^{th} day and 100^{th} day) and after delivery a week of washout period again hemoglobin was taken.

- **Therapeutic yoga:** In Pre-test, Stress assessment was done by using Perceived Stress Scale (PSS) & Anxiety assessment was done by using Generalized Anxiety Disorder scale, duration of all asanas around 30 minutes, in a weekly once upto 12weeks (12 sessions). Each mother should attend minimum 10 sessions and Post test carried out after 10 sessions.

  Maternal and neonatal outcome will be assessed after delivery.

For Control group followed routine management protocol. Pre-test and post-test were carried out as like that of experimental group.

5.11 Data analysis: Data analysis is used to organize and interpret the data obtained during the research study. The collected data were entered into a Microsoft

spreadsheet and coded. SPSS software (Version 22.0) was used to analyze the coded data. Descriptive and Inferential statistics were used to analyze the raw data.

- **Descriptive statistics** such as frequency & percentage distributions used for categorical data and mean ± standard deviation / median (Interquartile range) for numerical data.

- **Inferential statistics:** Chi-square was done to find the association and Pearson correlation was done to assess the correlation. Effectiveness of the intervention was tested by RMANOVA, Independent and paired t-test.

6 RESULTS AND DISCUSSION

Section- A

6.1 Distribution of the demographic, obstetrical and dietary variables among antenatal mothers with anemia in experimental group and control group.

6.1.1 Socio- demographic data

The Socio demographic characteristics of the subjects that were collected include Age, Religion, Highest Educational Status, Occupation, Type of work, Family Income, Type of family, Are you practicing any other Alternative Therapies, Are you having any unhealthy habits, Are you aware about anemia during pregnancy and source of acquiring information.

These data were considered intervening variables and therefore provide important context for interpreting the findings of the study, as they might interact with the interpretation of intervention outcomes. It also ensures, if randomisation was successful. All socio-demographic variables were comparable at the baseline as determined by respective chi-square (χ^2) values.

The chi-square was computed to establish the pair matching of variables between the groups. The calculated chi-square value was not found to be statistically significant at $p<0.001$ level that clearly infers that homogeneity had been maintained for all the demographic variables.

6.1.2 Obstetrical variables

The Obstetrical variables characteristics of the subjects that were collected include number of Gestational week's, Registration of Pregnancy, Gravida, Para, Live, Abortion Age of last child birth, Visit to Antenatal clinic, Type of Pregnancy, any minor symptoms related to pregnancy and received any blood transfusion previously.

These data were considered intervening variables and therefore provide important context for interpreting the findings of the study, as they might interact with the interpretation of intervention outcomes. It also ensures, if randomisation was

successful. All socio-demographic variables were comparable at the baseline as determined by respective chi-square (χ^2) values.

The chi-square and Fishers exact test were computed to establish the pair matching of variables between the groups. The calculated chi-square and Fishers exact test value was not found to be statistically significant at $p<0.001$ level that clearly infers that homogeneity had been maintained for all the demographic variables.

6.1.3 Dietary variables

The Dietary variables characteristics of the subjects that were collected include Type of diet, diet habits, frequent consumption of intake of tea/ coffee, frequent consumption of fresh fruits & vegetables, using of iron supplementation and Iron vessels for cooking.

These data were considered intervening variables and therefore provide important context for interpreting the findings of the study, as they might interact with the interpretation of intervention outcomes. It also ensures, if randomisation was successful. All socio-demographic variables were comparable at the baseline as determined by respective chi-square (χ^2) values.

The chi-square was computed to establish the pair matching of variables between the groups. The calculated chi-square was not found to be statistically significant at $p<0.001$ level that clearly infers that homogeneity had been maintained for all the demographic variables.

Section-B

6.2 Effectiveness of Integrated therapeutic approach (ITP) on level of anemia, level of knowledge, stress, and anxiety among Antenatal mothers with Anemia in experimental group and control group.

Table 6.2.1: Effectiveness of Integrated therapeutic approach (ITP) on level of anemia among Antenatal mothers with Anemia in experimental group and control group.

N=208(104+104)

Test	Group	Mean	Std. Deviation	Std. Error Mean	Mean Difference	In-dependent t-test	p-value
Pre-test	Experimental group	9.87	0.38	0.04	-0.06	-1.153	0.250 NS
	Control group	9.92	0.32	0.03			
Post-test 1	Experimental group	10.17	0.41	0.04	0.20	3.960	<0.001 *** (SHS)
	Control group	9.97	0.29	0.03			
Post-test 2	Experimental group	10.37	0.41	0.04	0.37	7.267	<0.001 *** (SHS)
	Control group	10.00	0.31	0.03			
Post-test 3	Experimental group	10.57	0.41	0.04	0.49	10.048	<0.001 *** (SHS)
	Control group	10.07	0.28	0.03			
Post-test 4	Experimental group	10.77	0.41	0.04	0.67	13.049	<0.001 *** (SHS)
	Control group	10.10	0.32	0.03			

***-p<0.001 SHS- Statistically highly significant, NS- Not Significant

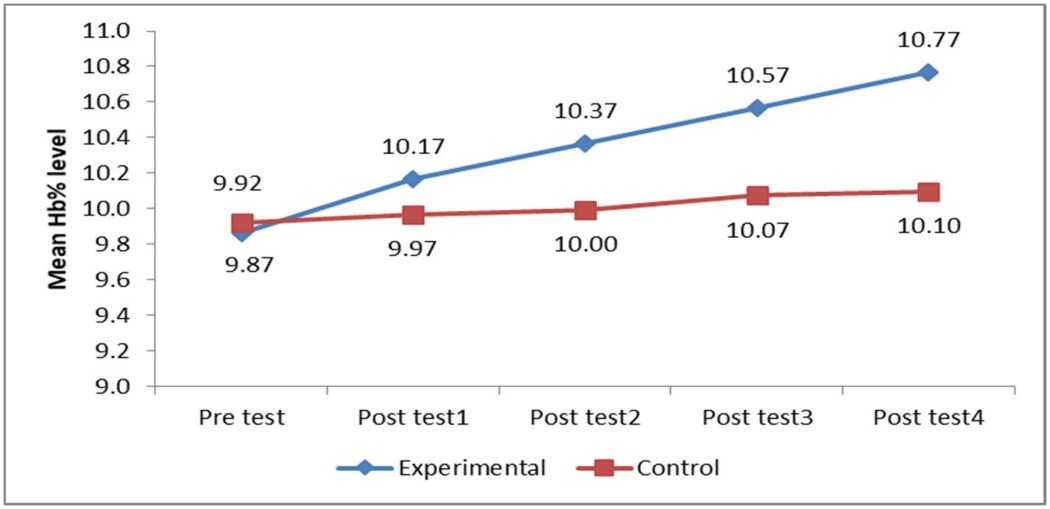

Figure 6.2.1: Effectiveness of Integrated therapeutic approach (ITP) on level of anemia among Antenatal mothers with Anemia in experimental group and control group.

Table and figure 6.2.1: shows that effectiveness of Integrated therapeutic approach (ITP) on level of anemia among Antenatal mothers with Anemia in experimental group and control group.

The calculated independent t-test value -1.153 shows statically not significant in pre-test for both the groups. In the experimental group, pre-test to post-test values showed a mean difference between post-test 1 to post-test 4 of 10.17 ± 0.41, 10.37 ± 0.41, 10.57 ± 0.41 and 10.77 ± 0.41. whereas in control group, pre-test to post-test values showed a mean difference between post-test 1 to post-test 4 of 9.97 ± 0.29,10.00 ± 0.31, 10.07 ± 0.28 and 10.10 ± 0.32. These findings showed statically highly significant difference between the experimental and control groups ($p < 0.001$). This result of the study is well supported by Sunita Kumari et.al (2019), The mean increase among experimental group were statistically significant when compared with control group.[21] Hence the stated hypothesis H1 was accepted.

Table 6.2.2: Effectiveness of Integrated therapeutic approach (ITP) on level of knowledge among Antenatal mothers with Anemia between experimental and control group.

N=208 (104+104)

Test	Group	Mean	Std. Deviation	Std. Error Mean	Paired difference	't' value Paired t test	Df	'p' value
Experimental group	**Pre-test**	3.92	1.537	0.151	7.673	24.475	103	<0.001*** (SHS)
	Post-test	11.6	2.157	0.211				
Control group	**Pre-test**	3.66	1.348	0.132	0.24	0.862	103	0.391 (NS)
	Post-test	3.42	1.969	0.193				

*****-p<0.001 SHS- Statistically highly significant, NS- Not Significant**

Table 6.2.2: shows that, Effectiveness of Integrated therapeutic approach (ITP) on knowledge regarding anemia among Antenatal mothers with Anemia between experimental and control group.

In experimental group, Mean value of pre-test was 3.92 ± 1.537 and in **post-test** was 11.6 ± 2.157. The calculated **paired't' test** value of t= 24.475 shows **Statistically highly significant** of effectiveness of integrated therapeutic approach (ITP) on knowledge regarding anemia among Antenatal mothers with Anemia in experimental group.

In Control group, the mean value of **pre-test** was 3.66 ± 1.348 and in **post-test** was 3.42 ± 1.969. The calculated **paired 't' test** value of t= 0.862 shows **Statistically not significant** in control group. A similar study was conducted by Ramachandran et al, (2023), At the end of the nutrition education intervention, there was a significant improvement in the hemoglobin level in the intervention group compared to the control group ($p < 0.02$).[22] Hence the stated hypothesis H1 was accepted.

Table 6.2.3: Effectiveness of Integrated therapeutic approach (ITP) on level of stress among Antenatal mothers with Anemia in experimental and control group.

N=208 (104+104)

Test	Group	Mean	Std. Deviation	Std. Error Mean	Paired difference	't' value Paired t test	Df	'p' value
Experimental group	**Pre-test**	20.9	1.58	0.155	9.606	44.603	103	<0.001*** (SHS)
	Post-test	11.3	1.386	0.136				
Control group	**Pre-test**	21.04	1.042	0.102	0.356	1.438	103	0.154
	Post-test	20.68	2.398	0.235				

*****-p<0.001 SHS- Statistically highly significant, NS- Not Significant**

Table 6.2.3: shows that, Effectiveness of Integrated therapeutic approach (ITP) on level of stress among Antenatal mothers with Anemia between experimental and control group.

In Experimental group, the mean value of **pre-test** was 20.9 ± 1.58 and **post-test** was 11.3 ± 1.387. The calculated **paired 't' test** value of t= 44.603 shows **Statistically highly significant** of effectiveness of integrated therapeutic approach (ITP) on level of stress among Antenatal mothers with Anemia in experimental group.

In Control group, the mean value of **pre-test** was 21.04 ± 1.042 and in **post-test** was 20.68 ± 2.398. The calculated **paired 't' test** value of t= 1.438 shows **Statistically not significant** in control group. This result of the study was well supported by Nikita Bhartia et al, (2019), The PSS score decreased by 17% in the Yoga group and increased by 8% in the control group after 12 weeks of study.[23] Hence the stated hypothesis H1 was accepted.

Table 6.2.4: Effectiveness of Integrated therapeutic approach (ITP) on level of anxiety among Antenatal mothers with Anemia in experimental and control group.

N=208 (104+104)

Test	Group	Mean	Std. Deviation	Std. Error Mean	Paired difference	't' value Paired t test	Df	'p' value
Experimental group	**Pre-test**	14.18	1.624	0.159	8.971	47.953	103	<0.001*** (SHS)
	Post-test	5.21	0.931	0.091				
Control group	**Pre-test**	14.73	2.394	0.235	0.337	1.004	103	0.318 (NS)
	Post-test	14.39	2.746	0.269				

*****-p<0.001 SHS- Statistically highly significant, NS- Not Significant**

Table 6.2.4: shows that, Effectiveness of Integrated therapeutic approach (ITP) on level of anxiety among Antenatal mothers with Anemia between experimental and control group.

In Experimental group, the mean value of **pre-test** was 14.18 ± 1.624 and in **post-test** was 5.21 ± 0.931. The calculated **paired 't' test** value of t= 47.953 shows **Statistically highly significant** of effectiveness of integrated therapeutic approach (ITP) on level of anxiety among Antenatal mothers with Anemia in experimental group.

In Control group, the mean value of **pre-test** was 14.73 ± 2.394 and in **post-test** was 14.39 ± 2.746. The calculated **paired 't' test** value of t= 1.004 shows **Statistically not significant** in control group. This result of the study was well supported by Satyapriya M et al. (2015), They concluded that yoga reduces anxiety and pregnancy related uncomfortable experiences.[24] Hence the stated hypothesis H1 was accepted.

Section- C

6.3 Effectiveness of Integrated therapeutic approach (ITP) on maternal and neonatal outcome between experimental and control group in post-test among Antenatal mothers with Anemia.

Table 6.3.1: Effectiveness of Integrated therapeutic approach (ITP) on maternal outcome between experimental and control group in post-test among Antenatal mothers with Anemia.

N=208(104+104)

S.No	Maternal outcome		Experimental group		Control Group		Chi-Square	p-value
			n	%	n	%		
1.	Mode of Deliveries	Vaginal delivery	97	93.2	88	84.7	3.960	0.047* (S)
		LSCS	7	6.8	16	15.3		
2.	Gestational Age	Term	104	100	104	100	NA	NA
3.	Weight gain	Yes	104	100	104	100	NA	NA
4.	Hypertension	No	104	100	104	100	NA	NA
5.	Stress	Yes	0	0	13	12.5	13.867	<0.001*** (SHS)
		No	104	100	91	87.5		
6.	Anxiety	Yes	0	0	9	8.7	9.407	0.002** (HS)
		No	104	100	95	91.3		
7.	Post Partum Hemorrhage	No	104	100	104	100	NA	NA
8.	Any other complication	No	104	100	104	100	NA	NA

*****-p<0.001 SHS- Statistically highly significant, **-p<0.001 HS- Highly significant, *-p<0.05 S- Significant, NS- Not Significant**

Table 6.3.1: shows that effectiveness of Integrated therapeutic approach (ITP) on maternal outcome between experimental and control group in post-test among Antenatal mothers with Anemia.

Mode of delivery: The proportion of vaginal delivery is higher in experimental group when comparing with control group. The calculated Chi-Square was 3.90 shows significant. This finding aligns with a study by Yekefallah, L *et al.* (2021) stated that pregnant women in the yoga group had more natural delivery than the control group and only a few of them underwent emergency CS for various reasons, showing a statistically significant.[25]

Stress: In the experimental group, none of the participants reported experiencing stress during pregnancy. Whereas in the control group, 13 participants (12.5%) reported experiencing stress during pregnancy. The calculated Chi-Square was 13.867 shows Statistically highly significant.

Anxiety: In the experimental group, none of the participants reported experiencing anxiety during pregnancy. Whereas in the control group, 9 participants (8.7%) reported experienced anxiety during pregnancy. The calculated Chi-Square was 9.407 shows highly significant.

Gestational Age, Weight Gain, Hypertension, Postpartum Hemorrhage and Any Other Complication: In both the experimental and control groups, the percentages for all these parameters are the same (100%). As such, no statistical tests like Chi-Square are conducted as there is no variation between the two groups in these aspects.

Table 6.3.2: Duration of labour

N=208(104+104)

Group	Mean	Std. Deviation	Independent t-test	p-value
Experimental group	11.30	2.38	0.997	0.320 (NS)
Control group	11.54	3.10		

NS- Not Significant

Table 6.3.2: shows that, Effectiveness of Integrated therapeutic approach (ITP) on duration of labour among Antenatal mothers with Anemia between experimental and control group.

In Experimental group, the mean value of effectiveness of integrated therapeutic approach (ITP) on duration of labour among Antenatal mothers with Anemia in experimental group in **post-test** was 11.30 ± 2.38 and the mean value in **control group** was 11.54 ± 3.10. The calculated **independent 't' test** value of t= 0.997 shows **Statistically not significant** of effectiveness of integrated therapeutic approach (ITP) on duration of labour among Antenatal mothers with Anemia in experimental group and control group.

Table 6.3.3: Effectiveness of Integrated therapeutic approach (ITP) on neonatal outcome between experimental and control group in post-test among Antenatal mothers with Anemia.

N=208(104+104)

S.No	Neonatal outcome			Experimental group		Control Group		Chi-Square	P=value
				N	%	n	%		
1.	APGAR score	1minute	7	22	21.1	37	35.5	6.226	0.044* (S)
			8	72	69.2	62	59.6		
			9	10	9.7	5	4.8		
		5 minutes	8	1	0.9	11	10.5	9.487	0.009** (HS)
			9	31	29.9	33	31.8		
			10	72	69.2	60	57.7		
2.	NICU admission for Neonatal Care	No		104	100	104	100	NA	NA
3.	Neonatal sepsis:	No		104	100	104	100	NA	NA
4.	Visibility of congenital anomalies during physical examination	No		104	100	104	100	NA	NA
5.	IUGR	No		104	100	104	100	NA	NA
6.	IUD	No		104	100	104	100	NA	NA

*****-p<0.001 SHS- Statistically highly significant, **-p<0.001 HS- Highly significant, *-p<0.05 S- Significant, NS- Not Significant**

Table 6.3.3: shows that effectiveness of Integrated therapeutic approach (ITP) on neonatal outcome between experimental and control group in post-test among Antenatal mothers with Anemia.

APGAR score at 1 minute: In the experimental group, 21.1% of newborns had an APGAR score of 7, 69.2% had a score of 8, and 9.7% had a score of 9. Whereas In the control group, 35.5% of newborns had an APGAR score of 7, 59.6% had a score

of 8, and 4.8% had a score of 9. The chi-square test result is 6.226 with a p-value of 0.044, indicating a significant difference in the APGAR score at 1 minute between the experimental and control groups.

APGAR score at 1 minute and 5 minutes: In the experimental group, only 0.9% of newborns had an APGAR score of 8, 29.9% had a score of 9, and 69.2% had a score of 10. In the control group, 10.5% of newborns had an APGAR score of 8, 31.8% had a score of 9, and 57.7% had a score of 10. The chi-square test result is 9.487 with a p-value of 0.009, indicating highly significant difference in the APGAR score at 5 minutes between the experimental and control groups. This finding aligns with a study by Ellahe Mohyadin et al (2019) stated that no significant difference was observed between the yoga and control groups regarding the infants Apgar scores in the first and fifth minutes. The reason for the differences between these studies were the differences in the nature, type, intensity and frequency of yoga exercise in pregnant women during the pregnancy period. Hence the stated hypothesis H2 was accepted.

NICU admission for Neonatal Care, Neonatal sepsis, Visibility of congenital anomalies during physical examination, IUGR, and IUD:

In both the experimental and control groups, the percentages for all these parameters are the same (100%). As such, no statistical tests like Chi-Square were conducted as there was no variation between the two groups in these aspects.

Table 6.3.4: Birth weight

N=208(104+104)

Group	Mean	Std. Deviation	Independent t-test	p-value
Experimental group	2.461	0.399	0.069	0.945 (NS)
Control group	2.464	0.410		

NS- Not Significant

Table 6.3.4: shows that, Effectiveness of Integrated therapeutic approach (ITP) on birth weight among Antenatal mothers with Anemia between experimental and control group.

In Experimental group, the mean value of effectiveness of integrated therapeutic approach (ITP) on birth weight among Antenatal mothers with Anemia in experimental group in **post-test** was 2.461 ± 0.399 and the mean value in **control group** was 2.464 ± 0.410. The calculated **independent 't' test** value of t= 0.069 shows **Statistically not significant** of effectiveness of integrated therapeutic approach (ITP) on duration of birth weight among Antenatal mothers with Anemia in experimental group and control group.

Section-D

6.4: Correlation between the level of anemia, level of knowledge, stress and anxiety among Antenatal mothers with Anemia in experimental group and control group.

Table 6.4.1: Correlation between the level of anemia, level of knowledge, stress and anxiety among Antenatal mothers with Anemia in experimental group and control group.

N=208(104+104)

		Hemoglobin	Knowledge	Stress score	Anxiety score
Hemoglobin	**Pearson Correlation**	1			
	p-value				
Knowledge	**Pearson Correlation**	0.025	1		
	p-value	0.722			
Stress score	**Pearson Correlation**	0.054	0.057	1	
	p-value	0.443	0.415		
Anxiety score	**Pearson Correlation**	0.101	0.276	0.74	1
	p-value	0.149	<0.001*** (SHS)	<0.001*** (SHS)	

*****p<0.001 SHS- Statically Highly significant**

Table 6.4.1: shows that Correlation between the level of anemia, level of knowledge, stress and anxiety among Antenatal mothers with Anemia in experimental group and control group.

There was a positive correlation (0.276) between Anxiety score and level of knowledge on anemia. The p-value is <0.001, anxiety decreases when knowledge increases.

There was a high positive correlation (0.74) between Anxiety score and stress score. The p-value is <0.001, anxiety increases when stress increases.

Table 6.4.2: Correlation between the duration of labour and birth weight among Antenatal mothers with Anemia in experimental group and control group.

N=208(104+104)

Groups	Variable	Mean	SD	Standard Error of Mean	CV	Pearson Correlation	p-value
Experimental group	Duration of labour	11.5	2.64	0.26	23.0%	0.197	0.045* (S)
	Birth weight	2.46	0.4	0.04	16.3%		
Control group	Duration of labour	11.9	3.18	0.31	26.7%	0.045	0.275 (NS)
	Birth weight	2.46	0.41	0.04	16.7%		

***-p<0.05 S- Significant, NS- Not Significant**

Table 6.4.2: shows that correlation between the duration of labour and birth weight among Antenatal mothers with Anemia in experimental group and control group.

There was a significant correlation between the duration of labour and birth weight in experimental group whereas there was no correlation in control group. This finding aligns with a study by Corrigan L et al (2020). The evidence highlights positive effects of pregnancy yoga on anxiety, perceived stress, mode of birth and duration of labour. [26] Hence the stated hypothesis H3 was accepted.

Section- E

6.5 Association between the level of anemia, level of knowledge stress and anxiety with selected demographic, obstetrical variables and dietary habits in experimental group and control group.

The result revealed that demographic variable, family income had shown statistically significant association between the level of anemia with selected demographic variables in experimental group and control group and the remaining demographic variables had not shown statistically significant. Hence the stated hypothesis H4 was partially accepted.

There was no significant association between the level of anemia, level of knowledge, stress and anxiety with selected obstetrical and dietary variables in both groups. Hence the stated hypothesis H4 was rejected.

7. SUMMARY AND CONCLUSION

The study proves that Integrated therapeutic approach (ITP) was statistically significant in decreasing level of anemia, improving knowledge level, reduction of stress and anxiety, and improving maternal and neonatal outcome among antenatal mothers with anemia.

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APPENDIX

ORIGINAL ARTICLE

Effectiveness of Fenugreek Leaf Powder with Iron Supplementation vs Iron Supplementation Alone on Increasing Hemoglobin Level among Adolescent Girls with Anemia at Koravallimedu, Puducherry

Piraiseela Subramanian[1], Aruna Devi Masilamani[2], Bamalakshmi Jayaraman[3], Renuka Kandasamy[4]
Kishor Kumar Chandirasekaran[5]

Abstract

Background: Adolescence is defined by the World Health Organization (WHO), as the time span between the ages of 10 and 19 years. This is the "transitional period" between childhood and maturity. Major psychological, behavioral, and physical changes occur throughout this period; adolescence necessitates higher dietary requirements due to increased physical activity and fast growth.

Aims and objectives: To assess the pretest and posttest hemoglobin levels among the adolescent girls, to evaluate the effectiveness of fenugreek leaf powder with iron supplementation on anemia among adolescent girls. To compare the pretest and posttest hemoglobin levels among the adolescent girls in experimental and control group. To find out the association between hemoglobin level with selected demographic variables among the adolescent girls.

Materials and methods: The study used a two-group experimental pretest and posttest design. The sample of 60 adolescent girls was chosen using a random sampling procedure. The hemoglobin level was measured using a structured questionnaire and the mission Hb device.

Results: The study found a statistically significant difference between the effects of fenugreek leaf powder combined with iron supplementation vs iron supplementation alone on boosting hemoglobin levels in adolescent females with anemia in the control group.

Conclusion: The comparative study reveals that fenugreek leaf powder with iron supplementation is more effective than the iron supplementation alone on increasing the hemoglobin level among adolescent girls.

Keywords: Adolescent girls, Anemia, Fenugreek leaf powder, Hemoglobin, Iron supplementation.
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Acceptance Letter

To,

Aruna Devi M, Renuka K.

Manuscript Title: ***Effectiveness of structured teaching programme on Knowledge regarding anemia among Antenatal Mothers at Kirumampakkam, Puducherry.***

Dear Sir

I have immense pleasure to inform you that your paper has been accepted and the editorial board agrees to publish your paper in the forthcoming issue of the journal ADVANCES IN BIORESEARCH Vol 14 [3] 2023.

Thank You
Date:
21.08.2023
Place: AGRA

Dr. Manish Kumar
Editor-in-chief]
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Suggestions and Comments

Thank You for Your Valuable Comments and Feedback

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